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SPECIFICATION COVER SHEET

Client: Gowanus Canal Remedial Design Group

Project: Gowanus Canal – 4th St Turning Basin Pilot Study – Dredging and Capping

Project #: HPH106A

SPECIFICATION SECTION: 35 20 23.13 **TITLE:** DREDGING AND DEWATERING

SPECIFICATION PREPARED BY:
(Specification Preparer, SP)
Signature _____ Date 5/19/17
Name Jeremy Gasser

SCOPE AND FORMAT CHECKED BY:
(Scope and Format Checker, SFC)
Signature _____ Date 5/19/17
Name Jessica Fears

DETAILED REQUIREMENTS CHECKED BY:
(Detailed Requirements Checker, DRC)
Signature _____ Date 5/19/17
Name Darrell Nicholas

APPROVED BY:
(Specification Approver, SA)
Signature _____ Date 19 MAY 2017
Name J.F. Beech

Record of Revision (Number and initial all revisions)

Rev. No.	Reason	Date	By	Checked	Approval
0	TB4 Pilot Study Design – Issued for Bid	05/19/17	JMG	JMF	JFB

SECTION 35 20 23.13

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SECTION 35 20 23.13

DREDGING AND DEWATERING

PART 1 GENERAL

1.01 SUMMARY

A. This Section presents details regarding the Contractor's dredging and subsequent dewatering in the 4th Street Turning Basin and under the 3rd Avenue Bridge.

1.02 RELATED SECTIONS, PLANS, AND DOCUMENTS

A. Section 01 32 00 Construction Progress Submittals

B. Section 01 33 00 Submittals

C. Section 01 35 29 Health Safety and Emergency Response Requirements

D. Section 01 41 00 Regulatory Requirements

E. Section 01 57 19 Temporary Environmental Controls

F. Section 01 71 23 Site Surveying and Grade Control

G. Section 02 51 19 Dredged Sediment and Waste Management

H. Section 02 60 16 Sediment and Floatables Containment

I. Section 31 10 00 Site Preparation

J. Section 31 41 16 Sheet Pile Installation

K. Section 35 43 00 Cap Construction

L. Section 44 08 40 Dredge Water Treatment System

M. Contract Documents

1.03 REFERENCES

A. AHRS, LLC, August 2016 (2016b). "PD-14 Cultural Resource Monitoring Plan, Gowanus Canal Superfund Site, Brooklyn, New York." Prepared for Gowanus Canal Environmental Remediation Trust (GCERT) and Geosyntec Consultants, Inc.

B. Geosyntec, 2016. "Summary of Geotechnical Design Parameters." Preliminary (35%) Design Submittal. (Provided as Attachment K.5).

C. Geosyntec, 2017. "Project Completion Report, Debris Removal Pilot Study, 4th Street Turning Basin, Gowanus Canal." Draft in progress.

D. United States Army Corps of Engineers (USACE), November 2013. "Hydrographic Surveying Engineer Manual." EM 1110-2-1003.

E. USACE, November 2014. "Safety and Health Requirements." EM 385-1-1.

F. TRC, 2017. "Gowanus Community Air Monitoring Plan (Draft in progress)."

1.04 DEFINITIONS

A. Bed Leveling or Dragging – The use of a drag bar or similar apparatus to level the sediment surface.

B. Debris – Material separated from Dredged Sediments during the material separation process (as shown in the Construction Drawings and described in this Section) or any object (wood, concrete, tires, plastic, rocks, rubbish, etc.) greater than 6 inches that is not considered Dredged Sediment.

C. Dredged Sediment – Material removed from the Canal which passes through the material separation process as shown in the Construction Drawings and described in this Section.

D. Excessive Dredging – Material removed beyond the allowable OD will be considered excessive.

E. Glacial Deposits – Sediment consists of gravelly sand, poorly and well graded sand, fine to coarse grained sand and small to large sub-angular gravel, with varying amounts of silt and silty sand, with some clay (sometimes interbedded to laminated). Color ranges from tan to brown to gray to dark gray and reddish brown. Density ranges from very loose to very dense, generally densifying with depth.

F. Grade or Required Depth – Depth of dredging the Contractor must achieve for approval of dredging completion.

G. Grizzly Bars – A deck of equally spaced bars placed on a collection container or hopper to separate debris from excavated or dredged material.

H. Native Alluvial Sediment – Sediment consists of marsh deposits (denser than soft sediment), mixtures of silt sandy silt, sand, clay, fibrous roots, and vegetation/wood debris. Color ranges from reddish brown to dark gray to black. Consistency ranges from very soft to stiff/medium.

I. Overdredge Allowance (OD) – Depth below grade that is not required to be removed, but for which the Contractor will be paid.

J. Overdredge Volume – Volume between grade (required depth) and OD depth that is not required to be removed, but for which the Contractor will be paid if it is removed.

K. Phase I Dredging – Dredging of Soft Sediment.

L. Phase II Dredging – Dredging of Targeted Native Alluvial Removal Areas (TNARA).

M. Phase III Dredging – Dredging of Sediments beneath the 3rd Avenue Bridge.

N. Required Dredge Volume – Volume of material, excluding OD volume, that the Contractor must remove prior to acceptance of dredging completion.

O. Side Slopes – Slope of the cut or fill expressed as the ratio of horizontal distance to vertical distance.

P. Slotted Excavation – Dredging method used during Phase II dredging and presented in the Construction Drawings that consists of dredging and daily post-dredging backfill.

Q. Soft Sediment – Sediment consists of organics, organic silts and clays with varying components of sand, silty sand, gravel, and debris/trash. Color ranges from grey to black and dark brown to black. Consistency ranges from very soft to soft.

R. Survey – All surveys of the dredging area shall be hydrographic surveys in accordance with the USACE Hydrographic Surveying Manual.

S. Sweeping – The movement of the dredge bucket along the Canal bottom with the intent to level the dredged surface.

1.05 SUBMITTALS

A. The Contractor shall submit the following to the Owner's Representative in accordance with Section 01 33 00:

1. Dredging Work Plan

The Contractor shall demonstrate compliance with the requirements outlined in this Section and in related Sections and Construction Drawings. Describe the sequencing, details, and means and methods of all dredging operations, including, but not limited to, the following information:

a. Mobilization:

i. Proposed means and methods for barge mobilization and deployment of other vessels, equipment and support equipment.

b. Equipment:

   i. A list of dredge equipment to be used including specifications and capacities, and design of barges/dredging equipment and details regarding their conformance with Section 16.L: Floating Cranes/Derricks, Crane Barges, and Auxiliary Shipboard-Mounted Cranes in the USACE Safety and Heath Requirements (USACE 2014);

   ii. Size of scows to be used, ullage tables, and scow drafts when loaded;

   iii. Description of fuel storage areas and refueling procedures;

   iv. Details about global positioning system (GPS) to be used;

   v. Dredge visualization software to be used; and

   vi. Vendor information and/or detailed drawings of the environmental and conventional buckets to be used.

c. Scheduling:

   i. Sequencing of all major dredging and dewatering operations;

   ii. Anticipated dredge production rates and average cycle times; and

   iii. Procedure for barge movement, scheduling, and frequency.

d. Proposed means and methods for the following:

   i. Dredging in areas of shallow draft;

   ii. Best management practices to minimize the resuspension of sediments and control of odor;

   iii. Separating debris from dredged sediment;

   iv. Means and methods for excavating sediment adjacent to bulkheads and/or located in wall corrugations and offsets;

   v. Executing slotted excavation during Phase II Dredging;

   vi. Executing Phase III Dredging, including proposed equipment types and proposed access;

   vii. Sourcing, transport, staging, and placement of post-dredging backfill;

viii. Offloading sorted debris and dredged material (if applicable) onto the asphalt pad at the Staging Site;

ix. Removing and transporting decant water from barges to the Dredge Water Treatment System located at the Staging Site;

x. Monitoring, surveying, and reporting dredging progress to meet the grades shown on the Construction Drawings;

xi. Protecting structures, utilities, and banks during dredging (e.g., the use of protective bumpers, areas intended for anchoring along with the location of sensitive structures, etc.);

xii. Tying up and securing barges; and

xiii. Keeping the public clear of dredging operations.

e. Personnel:

i. Current crane and other equipment operator (i.e. boat captains, etc.) certifications and qualifications shall be provided for all operators, including years of experience; and

ii. Organizational chart that illustrates project management team and chain of communication during dredging operations.

f. Daily Inspections:

i. Inspection forms of all barges and scows including load limits; and

ii. Procedure for inspecting major equipment (e.g. excavators, bucket/grapple/rake attachments, pumps, generators, piping), including inspection frequency and proposed plan for addressing equipment malfunction.

2. Surveys (conducted by the Contractor):

a. Weekly progress surveys of the entire 4th Street Turning Basin, including the access channel, will be required for the duration of dredging. The following will be required for each survey:

i. A bathymetry map depicting 1-foot contours within the 4th Street Turning Basin;

ii. A map with the dredge bucket tracks for the week overlaid 1-foot contours within the 4th Street Turning Basin;

iii. Calculated weekly volume removed; and

iv. Calculated cumulative project volume removed.

b. After-Dredge (AD) surveys will be performed by the Contractor after each phase of dredging and backfilling. AD surveys shall contain the following information:

i. Sorted minimum sounding data in XYZ format;

ii. Sorted average sounding data in XYZ format;

iii. A bathymetry map depicting 0.5-foot contours within the 4th Street Turning Basin with minimum soundings from each grid cell (soundings below grade shall be in one color, while soundings above grade shall be another);

iv. A bathymetry map depicting 1-foot contours within the 4th Street Turning Basin overlaid with all bucket tracks for that phase;

v. Total dredge volume to grade calculation; and

vi. OD volume calculation.

c. Probing results from along the sheet pile bulkhead supports;

3. Daily and Weekly Progress Reports. Detailed requirements for daily and weekly submittals are provided in Section 01 32 00.

1.06 HEALTH AND SAFETY REQUIREMENTS

A. The Contractor shall comply with environmental health and safety/training requirements in accordance with the approved Health and Safety Plan and Section 01 35 29.

B. The Contractor shall comply with environmental health and safety/training requirements in accordance with the USACE *Safety and Health Requirements* (EM 385-1-1), specifically sections 16 – Cranes and Hoisting Equipment and 19 – Floating Plant and Marine Activities.

PART 2 PRODUCTS

2.01 EQUIPMENT

A. Furnish equipment necessary to perform dredging and dewatering operations in accordance with this Section, the Construction Drawings, and the approved Dredging

Work Plan. Clean and decontaminate equipment and vessels in accordance with Section 02 51 19. Equipment to include:

1. Material Handler. Described in Section 02 51 19.

2. Dredge. Barge shall be narrow enough to maneuver between the Staging Site and the 4th Street Turning Basin. The Ferrara Brothers property (Block 471, Lot 1), just north of the Staging Site, often has a material deck barge docked at the property. Additionally, the barge shall have a shallow enough draft to not run aground within the Canal or Turning Basin. When the deck barge is present, the available horizontal clearance to the adjacent bulkhead is less than 30 feet. There shall be sufficient room on board the barge to accommodate the excavator or crane, water tanks, buckets, office, and other equipment. The barge and excavator shall be equipped with real time kinematic (RTK) GPS and dredge visualization/tracking software (e.g. Hypack, TELEDYNE PDS Dredge, etc.).

3. Tugboats. Tugboats shall not draft more than seven feet nor be longer than 60 ft to access the 4th Street Turning Basin and maneuver throughout the Canal and Turning Basin. Tugboats shall be narrow enough to maneuver between the Staging Site and the 4th Street Turning Basin.

4. Scows. Scows shall be narrow enough to maneuver between the Staging Site and the 4th Street Turning Basin. All scows must have draft markings and an ullage table for load volumes. Split hull scows (i.e. dump scows) are not permitted.

5. Grizzly bars. The Contractor shall use grizzly bars with a maximum spacing of 6-inches to sort debris from sediment. The use of vibrating grizzly bars is recommended based on results from the 4th Street Turning Basin Debris Removal Pilot Study (Geosyntec, 2017).

6. Grapples and Rakes. Grapples shall be orange peel style or similar for handling of debris. Grapples and rakes shall be capable of manipulating a variety of debris types and sizes as shown on the Construction Drawings.

7. Environmental Clamshell Bucket. Enclosed level-cut environmental bucket shall be sealed with venting to relieve pressure while lowering the bucket, but shall not allow water to drain following collection of material. The bucket shall be of sufficient capacity to efficiently remove the sediment as shown on the Construction Drawings.

8. Conventional Clamshell Bucket. Conventional clamshell bucket shall have a completely open top. The bucket shall be of sufficient capacity to efficiently remove the sediment as shown on the Construction Drawings.

2.01 MATERIALS

A. Low Permeability Backfill

a. The requirements for the low permeability backfill are shown on the construction drawings

b. The Contractor shall add bentonite to sand that meets the requirements of the Leveling Layer as defined in Section 35 43 00.

c. The Contractor shall submit test results for the sand-bentonite mixture that demonstrates the target hydraulic conductivity is achieved.

B. Post Dredging Sand Backfill

a. The requirements for the Post-Dredging Sand Backfill are shown on the Construction Documents.

PART 3 EXECUTION

3.01 GENERAL

A. Locate utilities within the 4th Street Turning Basin and any other areas where utilities may be encountered during Work.

B. Verify existing conditions as shown on the Construction Drawings prior to beginning Work in this Section.

C. Review sediment characteristics provided in the Summary of Geotechnical Design Parameters (Attachment K.5).

D. Conduct Work in accordance with the regulatory requirements outlined in Section 01 41 00.

E. Remove, transport, and dispose of dredged materials and solid waste in accordance with Section 02 51 19.

F. Decontaminate equipment and barges in accordance with Section 01 57 19.

3.02 EQUIPMENT OPERATORS

A. All dredge and equipment operators (i.e. boat captains) shall have a minimum of 2 years of experience with the type of equipment they are to be operating.

3.03 DREDGING OPERATIONS

A. Dredging activities shall be completed according to the following sequence:

1. Conduct pre-construction photographic survey of bulkheads according to Section 31 41 16;

2. Install sediment and floatables containment as described in Section 02 60 16;

3. Dredge the access channel within the 4th Street Turning Basin as shown in the Construction Drawings;

4. Excavate test pits along existing bulkheads and install bulkhead supports as shown in the Construction Drawings;

5. Conduct Phase I Dredging within the 4th Street Turning Basin, in lifts, to the depths presented in the Construction Drawings;

6. Conduct Phase II Dredging, with slotted excavation in areas specified on the Construction Drawings, in the locations and to the depths presented in the Construction Drawings;

7. Conduct Phase III Dredging beneath the 3rd Avenue Bridge to the depths and extents presented in the Construction Drawings (Contractor may choose to complete this task any time after installation of bulkhead supports, but before start of capping); and

8. Backfill select dredged areas within the 4th Street Turning Basin not already backfilled during Phase II work as presented in the Construction Drawings.

B. The sequence of work should be logical and account for vessel traffic throughout the Canal, restrictions to navigation (e.g. bridges, tides), and long lead-time items such as permit approvals or disposal facility approvals/authorizations.

C. The Contractor shall remove sediment to the extents and grades shown on the Construction Drawings and within the tolerances defined in this Section.

1. Dredging will be performed with an environmental bucket to the extent practical. If debris present in the Canal prevents the environmental bucket from fully closing or otherwise significantly interferes with operations, a conventional clamshell bucket may be used with the approval of the Owner's Representative. The Owner's Representative shall be provided with the basis, including a field demonstration, for recommending the use of a conventional clamshell bucket. Unless otherwise approved by the Owner's Representative, the Contractor shall switch back to the environmental bucket when conditions improve and allow successful operation of the environmental bucket.

2. Access Dredging: The dredging of the access channel is needed to allow barge access to install the bulkhead supports. Access dredging shall be completed to the specified elevations in the Construction Drawings. Maximum vertical OD allowance for access dredging is 6 inches (0.5 ft). In areas where Phase I Dredging is directly below access dredging, OD will not be recorded for access dredging. Volume removed in these areas will be accounted for and paid under Phase I Dredging.

3. Phase I Dredging: Soft sediment shall be dredged in a series of lifts to the grades shown in the Construction Drawings.

    a. A first pass, with a lift no greater than 4 ft in depth, should be completed across the entire 4th Street Turning Basin to allow for bulkhead monitoring during dredging, as outlined in Section 31 41 16. If bulkhead monitoring indicates the bulkhead stability is acceptable, then the Contractor shall continue with additional passes to a maximum thickness of 4 ft (or to final grade, whichever is shallowest) across the 4th Street Turning Basin. This process shall continue until the design grade is achieved across the entire dredge area. It may take a total of 3 to 4 passes to achieve desired grades.

    b. If instability of the bulkheads is observed according to Section 31 41 16, or if any other problem is encountered, the Contractor shall be prepared to stop Work at the direction of the Owner's Representative. The Owner's Representative will work with the Contractor to determine additional or alternative shoring approaches as necessary.

    c. Maximum vertical OD allowance for Phase I is 6 inches (0.5 ft). In areas where Phase II Dredging is directly below access dredging, OD will not be recorded for Phase I Dredging. Volume removed in these areas will be accounted for and paid under Phase I Dredging.

4. Phase II Dredging: After Phase I Dredging is completed, the Contractor shall begin Phase II Dredging in accordance with the Construction Drawings.

    a. Sediment removed during Phase II must be managed separately from Phase I sediment, as discussed in Section 02 51 19.

    b. As presented on the Construction Drawings, some areas of Phase II Dredging require dredging by the slotted excavation method. The slotted excavation method shall be completed in lifts with a maximum depth of 2.5 ft (30 inches). Similar to Phase I Dredging, bulkhead stability will be monitored during dredging. If instability of the bulkheads is observed according to Section 31 41 16, or is any other problem is encountered, the Contractor shall be prepared to stop Work at the direction of the Owner's Representative. Maximum vertical OD allowance for Phase II is 6 inches (0.5 ft).

c. The Contractor shall complete AD hydrographic surveys during slotted excavation associated with Phase II Dredging. Surveys will be performed prior to backfilling, and the Contractor shall present results showing the target dredge depths have been achieved to the Owner's Representative for approval prior to placement of post-dredging backfill in the dredged areas. AD surveys will also be collected following placement of backfill, and Contractor shall present to the Owner's Representative for approval the results showing the target backfill elevations have been achieved. Note that in areas where slotted excavation is required, the Contractor may perform several AD surveys per day, alternating between excavation and backfilling in accordance with requirements specified on the Construction Drawings. An independent AD survey will not be completed by the Owner's Representative for areas where slotted excavation is required during Phase II dredging.

d. The Contractor shall also complete an AD hydrographic survey of areas dredged during Phase II which do not required slotted excavation.

e. The Contractor shall collect grab samples from the bottom of the dredge cut (approximately one sample per 500 square feet with a minimum of two grab samples per TNARA), as directed by the Owner's Representative, and place samples in a secure location on the barge to allow for safe visual observation by the CQA Consultant and EPA field personnel.

5. Phase III Dredging: The Contractor shall conduct Phase III Dredging any time following the installation of bulkhead supports, but before the start of capping. Dredging shall be completed to a uniform elevation in accordance with the Construction Drawings. Following dredging beneath the bridge and completion of the AD survey, a 6-inch layer of post-dredging sand backfill shall be placed in accordance with Section 35 43 00. The Contractor shall propose means and methods for Phase III Dredging with the following stipulations:

a. The Contractor may propose any equipment to complete this phase of dredging;

b. At no time shall equipment be affixed to or allowed to contact any part of the 3rd Avenue bridge;

c. The Contractor may approach the area to be dredged via the 4th Street Turning Basin (west of the bridge) or via the former 5th Street Turning Basin (i.e., slope from the U-Haul property east of the bridge);

d. If the Contractor approaches the area to be dredged from the former 5th Street Turning Basin, the Contractor must first notify the Owner's Representative prior to any negotiations with the property owner(s), obtain written property

access from the property owner and following completion of the work must restore the site to original conditions;

e. The dredge surface as presented in the Construction Drawings was designed for bridge stability;

f. A vertical OD of 0.5 ft (6 inches) is allowable for this phase of dredging;

g. The Contractor is to refrain from excess dredging (i.e. past the OD line) beneath the 3rd Avenue Bridge; and

h. The Contractor is responsible for any repairs that may be required to the bridge due to excessive dredging.

6. Except where already placed during Phase II work, post-Dredging sand and low-permeability backfill shall be placed to the elevations presented in the Construction Drawings and in accordance with Section 35 43 00.

7. Side slopes for all dredging activities are designed at 3H:1V, unless otherwise specified. Side slopes may be formed by box cutting or dredging along the side slope.

8. Dredged areas are not to be bed leveled or swept with the dredge bucket.

D. Dredging shall occur in an orderly and logical manner in accordance with this Section, the Construction Drawings, and the approved Dredging Work Plan. If unanticipated conditions are encountered, the Contractor shall immediately stop and verbally notify the Owner's Representative. Following resolution of the situation, the Contractor will provide written notification to the Owner's Representative detailing the unanticipated conditions and resulting resolution.

E. Debris shall be separated from sediment in accordance with Section 02 51 19 and transported to the asphalt pad at the Staging Site and disposed in accordance with Section 02 51 19 and the Construction Drawings.

1. The Contractor shall use grizzly bars to remove debris larger than 6 inches.

2. Cultural resources are to be preserved in accordance with this Section and as shown in the Construction Drawings.

3. Debris is to be washed on the barge or asphalt pad at the Staging Site as follows:

a. All wash water shall be from a potable water source.

b. The Contractor shall wash debris to remove sediment that can be practically removed from the debris surface using high pressure spray water. If the

Owner's Representative determines that sediment that is practical to remove with high pressure spray water has not been removed, the Contractor shall perform additional washing at no additional cost to the Owner. Removal of sediment from paper, cardboard and decaying wood is not considered to be practical. Additionally, the removal of adhered sediment that would require the use of a putty knife or similar scraping tool is not considered practical. The removal of sediment from voids and cavities in the debris that requires special handling of debris will not be required. The Contractor shall apply sufficient effort to demonstrate that all exposed surfaces on the debris are pressure washed.

F. Barge dewatering and transport of wash water shall be conducted as follows:

1. Barges will contain water that must be decanted prior to sediment processing. The Contractor shall provide an adequate period of mooring to allow solids to settle in the barge. After the initial barge settling period, the Contractor shall transfer decant water to the Dredge Water Treatment System (DWTS) described in Section 44 08 40.

2. Wash water from debris washing on the barge shall be captured and transported to the DWTS.

G. Discharges of sediment, fuel, oil, or other materials into the Canal are prohibited. The Contractor shall notify the Owner's Representative immediately if accidental discharge occurs and shall take actions to mitigate the spill/release. Spills will be prevented and managed in accordance with Section 01 57 19. Maintain and repair sediment and floatables containment in accordance with Section 02 60 16.

H. Maintain Site order and cleanliness in accordance with Section 02 51 19.

I. For safety of the deckhands or other crew walking down the scows, the walkways shall be cleaned of sediment in the following fashion:

1. The walkways shall first be shoveled clear of sediment and the sediment placed in the scow;

2. The remaining residual sediment can be washed with water from the Canal, so long as an excessive amount of water is not used; and

3. This wash water will not need to be captured for treatment.

J. The Contractor shall protect and maintain the stability of bulkheads, bridges, and other structures adjacent to the 4th Street Turning Basin that could be impacted by sediment removal. The Contractor shall repair damages to structures resulting from dredging or bulkhead support operations at the Contractor's expense.

K. For all phases of dredging:

1. The Contractor is required to dredge to grade shown in the Construction Drawings;

2. The Contractor will be paid for limited vertical OD as noted in this Section and the Construction Drawings. Horizontal dredging extends shall conform to the neat lines indicated in the Construction Drawings, and no OD will be paid for horizontal OD;

3. Any material that is classified as excessive dredging will be removed, processed, and disposed at the Contractor's expense;

4. Any post-dredging backfill as a result of excessive dredging will be sourced and placed at the Contractor's expense; and

5. Any damage to adjacent structures, bulkheads, and bridges due to excessive dredging shall be repaired at the cost of the Contractor as approved by the Owner's Representative.

3.04 ENVIRONMENTAL PROTECTION

A. The Contractor shall control sediment and floatables in accordance with Section 02 60 16 during dredging.

B. Work will be conducted in compliance with water quality requirements described in Section 01 57 19.

C. Work will be conducted in compliance with the community air monitoring plan (CAMP), which will be provided upon request.

D. Implement environmental controls for spill prevention, dust, noise, and air in accordance with Section 01 57 19.

3.05 PROTECTION

A. Protect bulkheads against damage. The Contractor shall not use bulkheads to reposition barges or other vessels. The Contractor shall repair or replace bulkheads damaged during the Work at no cost to the Owner.

B. The only bulkhead onto which scows may be moored is the bulkhead east of the asphalt pad at the Staging Site. Bulkhead protection (e.g. bumpers) shall be installed prior to tying of scows. Scows may not be moored to any other bulkhead or dock. No scows may be tied to the dock at the Staging Site.

C. Protect existing utility services and distribution systems from damage or displacement.

D. Protect existing improvements against damage. Repair or replace items damaged during Work.

3.06 SURVEYS AND VERIFICATION OF MATERIAL REMOVAL

A. Hydrographic Surveys by Contractor - Conduct hydrographic surveys, including surveys beneath the 3rd Avenue Bridge, in accordance with Section 01 71 23.

1. Progress Surveys. At a minimum, the Contractor shall conduct weekly hydrographic surveys to maintain a record of the depth and extent of dredging throughout the course of the Work.

2. AD Surveys. The Contractor shall conduct hydrographic surveys after the following phases of dredging and backfilling to verify that sediment has been removed to the grades shown on the Construction Drawings:

   a. Access Dredging

   b. Phase I Dredging

   c. Phase II Dredging

   d. Phase II Slotted Excavation Dredging

   e. Phase III Dredging

   f. After Dredging Backfill

3. The Contractor shall perform the surveys at the completion of each phase of dredging with the exception of the Phase II Slotted Excavation Dredging and provide submittals to the Owner's Representative indicating that:

   a. Required grades have been met in all grids. The Contractor shall redredge any grid more than 6 inches above the required grade;

   b. The toe of all slopes show clearance to final grade; and

   c. All grab samples have been collected in Phase II Dredging areas.

4. Surveys related to Phase II Slotted Excavation Dredging shall be conducted daily, or more frequently if required to conform with requirements listed on the Construction Drawings, and shall be completed prior to backfilling.

5. Since a hydrographic survey may not be accurate within the notches of the sheet pile wall, sediment removal shall be verified in these areas by probing as follows:

a. At every 5th notch in the sheet pile, the Contractor shall probe with a leadline within the notch to determine the AD soft sediment depth. A weight with a minimum diameter of eight inches and weighing at least 8 pounds shall be used for probing. If the AD depth meets the design depth presented in the Construction Drawings, that section of sheet pile is considered to have passed clearance. If probing indicates the depth is insufficient, the Contractor shall continue to dredge in that area until design depth is achieved.

B. Hydrographic Surveys by Others

1. Before Dredging. Before dredging begins, the Owner's Representative shall have a Before Dredging (BD) survey performed. The survey will meet the requirements of Section 01 71 23, and the results of the survey will be provided to the Contractor for their use. The BD survey shall provide the baseline for volume calculations for measurement for payment.

2. After Dredging. Following the receipt of each of the Contractor's AD surveys, except for the Phase II Slotted Excavation Dredging, a hydrographic survey will be performed by others. Following approval of the Contractor's survey submittals by Owner's Representative, the hydrographic survey will be scheduled for the next business day. The Contractor shall relocate his equipment at no additional cost to the Owner to allow access for the hydrographic survey. Upon completion of the hydrographic survey, the Contractor shall proceed with the next phase of dredging or backfilling.

3.07 COMMUNICATION

A. For all marine work, the Contractor shall provide a means of communication between personnel working between vessels and on land (e.g., two-way marine VHF radio).

B. At minimum, every vessel operator and the dredge operator shall have a working VHF radio at all times.

C. The Contractor shall determine a working channel for the project and inform all Site personnel.

D. In addition to the designated project channel, the Contractor shall monitor VHF channels 14 (New York Traffic) and 16 (USCG).

3.08 CANAL AND SITE ACCESS

A. For all marine work, the Contractor must coordinate with Coast Guard and any local marine traffic.

B. The Contractor shall minimize their impact on vessel traffic within the Canal.

C. The Contractor is responsible for coordinating all required bridge openings through NYC DOT in one of the following three ways:

1. DOT Bridge Operator on marine radio channel 13;

2. DOT Bridge Operations Office at 212-839-3740; or

3. DOT Communications Center at 718-433-3340.

D. Note that several bridges between the 4th Street Turning Basin and the entrance to the Canal have restricted horizontal and vertical clearances. The Contractor shall demonstrate that all equipment and materials to be used for this Work can pass through the bridges.

E. The Contractor shall be responsible for Site security and shall maintain site gate access control throughout the work as specified in Section 31 10 00. Details regarding vehicular access and parking are also discussed in Section 31 10 00.

3.09 CULTURAL RESOURCES MONITORING

A. Cultural resources refer to archaeological features, artifacts, and historic structures (bridges, bulkheads, buildings, etc.) located within the Canal that are potentially eligible for the National Register of Historic Places (NRHP). In general, properties (including objects and vessels) that are in excess of 50 years old are potentially eligible for the NRHP.

B. The Contractor shall be responsible for reviewing the requirements listed in the Cultural Resource Monitoring Plan (AHRS, 2016) provided as Attachment K.6.

C. Cultural resources will be evaluated during dredging (all phases) and the debris management process.

1. All dredging and debris sorting activities must conform to the requirements of the Cultural Resource Monitoring Plan.

2. When dredging within the Level 2 Monitoring Areas as shown in the Construction Drawings and the Cultural Resource Monitoring Plan, an onsite archaeologist (provided by the Owner's Representative) will be present for visual inspection of debris.

3. When dredging outside the limits of the Level 2 Monitoring Areas, Contractor personnel who received training from the archaeologist (as described herein) shall monitor dredging activities in accordance with requirements in the Cultural Resource Monitoring Plan. A monitoring archaeologist may not be on-site during this time; however, the Contractor shall photograph all man-made debris removed and send the photographs to the archaeologist for review on a daily basis.

4. In accordance with the Cultural Resource Monitoring Plan, training will be provided onsite by the monitoring archaeologist for Contractor staff working on debris and sediment sorting and management prior to the start of Work. This training will help non-archaeological staff to identify potential cultural resources and understand the protocol in the event any are encountered during dredging and debris sorting activities. Training will consist of approximately 60 minutes of discussion and PowerPoint presentation.

D. Should the monitoring archaeologist note features of archaeological potential during dredging and debris sorting activities, he/she may, as per the agreed monitoring methodology, request the operator to stop excavation as necessary. Further actions, such as avoiding the area of the potential resource or altering the way in which the machine is operated, may be specified by the Owner's Representative.

1. If unknown or unanticipated cultural resources are encountered, additional investigation may be needed. This may be accomplished by removing relevant debris for evaluation, if the deposit is small enough.

2. For some areas where Work is being conducted and known or suspected cultural resources are located nearby, an onsite Archaeologist (provided by the Owner's Representative) may be present on the barge for visual inspection of the debris during removal activities. The areas of known or suspected cultural resources are highlighted on the Construction Drawings and on the maps included in the Cultural Resource Monitoring Plan.

3. Objects classified as potential cultural resources (i.e. potentially historic or pre-historic artifacts) by the on-site Archaeologist shall be stored at the Staging Site in coordination with the Owner's Representative.

3.10 DREDGED MATERIAL TRANSPORT, TREATMENT, AND MANAGEMENT

A. The Contractor shall transport, treat and manage dredged material in accordance with Section 02 51 19.

[END OF SECTION]